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ABSTRACT

The papers presented as part of this symposium explore several aspects of integrating technology in teacher education. The title paper, presented by Christy J. Falba, reports on a study to investigate the process and progress of integrating technology into university level teacher education courses from the perspective of the university instructor. The study examined reasons for including technology in courses and concerns about innovation, in the context of six individual case studies of university faculty. The five seminar presentations are: "Technology Integration, Research, and Teaching: Balancing Social Contexts" (Tom Bean); "Cybersurfing: A New Professor Catches the Waves" (Juli K. Dixon); "Just the Tip of the Iceberg" (Patricia A. Markos) describing a career counseling curriculum that uses the Internet; "Learning To Deal with Ambiguities of Electronic Portfolios: Reassessing Visions of Technology To Deal with Reality" (Marilyn McKinney); and "E-mail Dialogue: Supporting the Preservice Teacher s Personal-Professional Voice" (Stanley J. Zehm). Individual papers contain references. (ND)

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ED 411 227

CHOREOGRAPHING CHANGE ONE STEP AT A TIME: INTEGRATING TECHNOLOGY IN TEACHER EDUCATION

A Symposium Presented at the Annual Meeting of the American Educational Research Association

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CHOREOGRAPHING CHANGE ONE STEP AT A TIME: INTEGRATING TECHNOLOGY IN TEACHER EDUCATION

Christy J. Falba

A Paper Presented at the Annual Meeting of The American Educational Research Association
March 25, 1997

> It could be said that every dance is a little world all its own. At times, such little worlds may be of interest solely for their own sake. At other times, however, they can serve as microcosms of the great world in which we live. --Anderson, 1987

Although expectations of school district administrators, parents, and students are that teachers use technology, teacher education programs often have not prepared them to teach with technology, and school districts may provide little inservice training and support (Norvak & Berger, 1991). According to the report of the U.S. Congress, Office of Technology Assessment (OTA) (1995), "The most direct and cost-effective way to educate teachers about technology is through the preservice education they receive in colleges of education or other institutions" (pp. 166-167).

The purpose of this study was to investigate the process and progress of integrating technology into university level teacher education courses from the perspective of the university instructor. The study examined reasons for including technology in courses, concerns about the innovation, and reflections of the participants at the conclusion of the one-semester study. Questions to be answered included the following:

1. What prompted the modification of course syllabi to include technology?
2. What are the outcomes of integrating technology into the courses?
3. How do instructors envision the integration of technology in teacher education?

4. What are the concerns about integrating technology?

Findings of this study have practical significance for researchers, faculty, and facilitators involved in the integration of technology in teacher education. Faculty concerns regarding technology integration, experiences with the process, and reflections regarding the results provide insight for future planning.

Background

One means of evaluating the effectiveness of preservice teacher education is by measuring the perception of first year teachers as to their preparedness to teach with technology. Results of various studies indicate that new teachers feel inadequately prepared to use technology in the classroom (Strudler, Quinn, McKinney, & Jones, 1995; Topp, Thompson, & Schmidt, 1994; U.S. Congress, 1995). According to Brooks and Kopp (1989), "If first-year teachers are expected to be creative and facile with technology, they deserve systematic exposure to technological enhancements at all levels of a coherent, interrelated preservice curriculum" (p. 4). A national survey of recent graduates who had been teaching an average of 2.8 years found that over 50% felt unprepared or poorly prepared to teach with technology (Willis, Willis, & Austin, 1995). In their teacher education programs, it was not typical for faculty to teach with technology.

Researchers have examined impediments to college faculty modeling effective use of technology. Barron and Goldman (1994) surveyed seventy teacher education faculty and administrators at two technology conferences held at Vanderbilt. Barriers to use of technology included "lack of time to learn about the equipment and to prepare to use new materials in class" (p. 102). Other barriers involved inadequate staff development opportunities and lack of needed technical support. Barriers are diminishing in some situations, however. Strudler, McKinney, and Jones (1995), in a case study of technology integration efforts by two professors, concluded "as the

benefits of technology use continue to increase and the problems of time, resources, and support are addressed, technology will more readily be integrated college-wide into methods courses and field experiences" (p. 15).

Brooks and Kopp (1989) suggested a fundamental reason why teacher education programs are slow to integrate technology may be the "absence of clear programmatic goals" (p. 5). Colleges of education are reexamining their programs based on guidelines established by the International Society for Technology in Education (ISTE) and the National Council for Accreditation of Teacher Education (NCATE). These standards incorporate 13 technology competencies for preservice teachers to acquire. In order to fulfill the ISTE/NCATE technology guidelines, a number of researchers have proposed similar models which include variations of three main components: (a) a core computer course, (b) modeling of technology by education faculty in methods classes, and (c) experiences with technology in student teaching (Handler, 1993; Norvak & Berger, 1991; Schrum, 1994; Wetzel, 1993).

Expectations for technology knowledge and use are not restricted to preservice and inservice classroom teachers, but extend to teacher education faculty as well. NCATE's 1995 Standards, Procedures, and Policies for the Accreditation of Professional Education Units includes a new indicator under faculty qualifications which states that "faculty are knowledgeable about current practice related to the use of computers and technology and integrate them in their teaching and scholarship" (p. 24).

In a recent review of the literature on information technology and teacher education, Willis and Mehlinger (1996) summarized the topic: "Most preservice teachers know very little about effective use of technology in education and leaders believe there is a pressing need to increase substantially the amount and quality of instruction teachers receive about technology" (p. 978). In discussing faculty and staff

development, Willis and Mehlinger pointed out that further education beyond the doctoral degree was traditionally up to the individual. Generally, during undergraduate or graduate work, faculty were not trained to use technology, and did not see it modeled. To integrate technology use into their teaching, many faculty members need training "to use new methods and new media effectively" (p. 1016).

Mergendoller, Johnston, Rockman and Willis (1994) conducted nine case studies of exemplary technology programs for the OTA Report, four of which involved preservice teacher preparation programs. In a cross-case analysis, the researchers noted "it is the functional use of educational technology to solve instructional problems and provide curricular and instructional opportunities that could not be achieved as efficiently or powerfully without the technology that is at the heart of each school's vision" (p. 231). User support was emphasized in the Mergendoller report. "Given a common expectation that educational technology can enhance traditional instructional approaches, the presence of one or more individuals who can provide one-on-one support greatly increases the probability that it will be so used" (p. 223).

Theoretical Framework

Integration of technology into teacher education courses involves educational change. Fullan (1991) stated, "We vastly underestimate both what change is...and the factors and processes that account for it" (p. 30). In writing about the meaning of educational change, Fullan argued that both the small picture and the big picture are important to understand. The small picture deals with the subjective meaning of change for the individual, while the big picture encompasses educational change as a sociopolitical process.

Five subprocesses of school change were described by Hord & Hall (1986). These cyclical and interactive phases included assessment, adoption, initiation, implementation, and institutionalization. Once a need for improvement has been

established through assessment, an innovation is chosen as a response. Sometimes, unfortunately, "innovations are adopted because they are 'good' and then a rationale is developed for why they are needed" (p. 5). Initiation is the phase that is often ushered in with enthusiasm in the effort to stimulate user commitment. "There appear to be available many more examples of initiating change in schools than there are of implementing (and institutionalizing) the change" (p. 6). Implementation, a critical phase, requires that assistance be provided such as skill training and one-on-one support. Institutionalization, the goal of educational change, is difficult to identify.

The Concerns-Based Adoption Model (CBAM) offers a means of examining institutionalization of change (Hall & Hord,1987). Stages of Concern, Levels of Use, and Innovation Configuration are the key elements of CBAM. Stages of Concern focuses on feelings, Levels of Use targets behaviors, and Innovation Configuration "deals directly with characteristics of the innovation and what use means when the innovation is the frame of reference" (p. 108).

In the present exploratory study, concerns of the participants regarding technology integration were examined. Stages of Concern includes seven levels, ranging from 0 to 6: (0) Awareness, (1) Informational, (2) Personal, (3) Management, (4) Consequence, (5) Collaboration, and (6) Refocusing (Hall & Hord,1987). Hall, George, and Rutherford (1979) described profiles associated with different stages of concern. A "nonuser" would have higher concerns at Stage 0 Awareness, Stage 1 Informational, and Stage 2 Personal, because they are concerned with acquiring information and about how they will be affected by the innovation. Stage 3 Management concerns generally increase with beginning use of the innovation. As experience and skill are gained, Stages 0-3 concerns tend to decrease and Stages 4-6 concerns increase. Another way of looking at the stages is by categorizing concerns related to self (Stages 0-2), task (Stage 3), and impact (Stages 4-6) (Hall & Hord,

1987, p. 60).

Todd (1992, 1993) was instrumental in designing an innovation configuration curriculum model for integrating technology at a northwest university. In her study, Todd considered conceptual, structural and support issues. She worked with faculty to include specific technology objectives for each course, and targeted faculty instructional development assistance. "Supporting faculty concerns is of particular importance since the success of integration depends upon willingness and ability of each faculty member to support integrating computer-based technologies in the teacher education program" (p. 9). Todd's summary pointed to a need for technology expectations to be communicated by administrators and supported by budgeting, timelines, and curriculum development meetings.

In examining 12 case studies of innovation, Huberman and Miles (1984) emphasized the link between staff development and implementation. They credited the amount and quality of assistance as being the most critical element of innovation implementation. It follows that faculty development is a key issue in promoting the integration of technology in teacher education.

Joyce (1988) described types of outcomes expected of training: (a) awareness of educational theories and practices, (b) changes in attitudes, (c) development of skill, and (e) transfer of training. Fullan's (1991) view of successful professional development portrays the teacher as a lifelong learner. This is an important idea in working with educational technology, given the ongoing changes taking place in hardware and software, and increasing use of the computer as a communications tool.

Lifelong learning can be situated within adult learning theory. Knowles theorized that andragogy, teaching adults, was distinctly different from pedagogy, teaching children (Pratt, 1993). In general, adult learning is characterized as more self-directed. Knowles's five assumptions included (a) self concept, (b) prior experience,

(c) readiness to learn, (d) learning orientation, and (e) motivation to learn. In addition to the methodology of andragogy, Knowles also suggested "that the essence of facilitation lies not in one's approach as much as in the relationship that exists between learner and facilitator" (p. 19).

This manuscript focuses on individual efforts to integrate technology into teacher education courses. As in previous integration efforts, the approach was to work with volunteer faculty members. They were encouraged and supported as they expanded their personal knowledge and implemented curricular changes.

Method

Research Design

This exploratory study employed a case study design with the researcher in the role of participant observer (Stake, 1995). It was a collective case study, with integration of technology in teacher education serving as the "puzzlement" or general problem (p. 3).

Site Selection

The College of Education within a major southwest university was selected as the site for the study, based upon proximity. In the 1994-95 academic year, 262 undergraduate degrees and 252 graduate degrees were conferred by the College of Education, and approximately 65 full-time professors were on the faculty. All faculty members had computers in their offices, and networking of the building provided easy email access and internet connectivity .

Participants

Six university professors who taught various teacher education courses participated in the study. They were selected based on willingness to adjust course syllabi to include mandatory or voluntary technology requirements for the Spring 1996

semester, and indicated an interest in using technology to expand teaching methodologies. Four of the professors were female, two were male. Length of time teaching at the university level varied from one year to thirty years. Two of the professors taught literacy education classes (pseudonyms Dr. Emher and Dr. Trebbon), one taught elementary teacher preparation classes (pseudonym Dr. Sanders), two taught mathematics methods classes (pseudonyms Dr. Gibson and Dr. Jacobs), and one taught career education and counseling (pseudonym Dr. Prichard). Consent forms which briefly described the study and delineated standard conditions such as anonymity were signed by participants and the researcher.

Researcher

The researcher was a graduate assistant in the doctoral program at the university. Her role in the spring semester was to facilitate faculty use of technology for personal productivity, integration into teacher education classes, and the use of technology in teaching. Faculty workshops and one-on-one technology appointments provided the main means of increasing faculty skills and knowledge. Demonstrations in content area classes were also designed and presented upon request. Full-time status provided the researcher frequent opportunities for informal exchanges, knowledge of the setting, and an ongoing, working relationship with the participants. Collaboration with the research participants was a key factor in facilitating technology use.

Data Collection

Data were collected through observations, questionnaires, interviews, and documents. Observations included faculty workshops, one-on-one help sessions, and classroom situations. A semistructured interview was conducted with each participant. Participants responded in writing to an open-ended Stages of Concern questionnaire which had one question: "When you think about integration of technology in teacher

education, what are your concerns?" Informal interviews were included in field notes, and pertinent documents such as course syllabi and email correspondence were examined. A group interview was videotaped near the end of the semester to elicit reflections regarding technology integration.

Data Analysis

Interviews were transcribed. Constant comparison analysis (LeCompte & Preissle, 1993) was used to illuminate emerging patterns, beginning as data were first collected and continuing throughout the study. Stages of Concern responses were analyzed using Hall and Hord's framework (1987). Interviews and observational data were coded into four main categories: (a) university context, (b) personal learning, (c) outcomes of integrating technology, and (d) the vision of technology integration in teacher education. Each case was first analyzed individually, and recurring themes within each case allowed for cross-case analysis. Additional triangulation included using field notes to verify interview information, asking informal questions to confirm observation notes, and analyzing the reflective group interview.

Limitations of the Study

Limitations of the study included selection of participants, biases, and data collection. Participants were volunteers who agreed to make changes involving uses of technology, and in effect had a vested interest in the outcomes. The researcher was immersed in the environment and while the role of technology facilitator provided a means of interacting closely with participants, it also created a bias toward wanting to see the participants succeed in their technology endeavors. Data included interviews, observations, and examination of documents collected over the course of the semester, but emphasis was placed on illuminating the views and perceptions of the participants.

Results

Summaries of the individual case studies provided insights into backgrounds and personal learning as it related to computers. These summaries, served to answer the first three research questions: (1) What prompted the modification of course syllabi to include technology? (2) What are the outcomes of integrating technology into education courses? (3) How do instructors envision the integration of technology in teacher education? Broader analysis of results across cases was used for the last research question: (4) What are the concerns about integrating technology in teacher education?

Dr. Prichard: It's Just the Tip of the Iceberg.

Dr. Prichard was an energetic and enthusiastic individual. Piles of papers and files occupied much of the desk and table in her office and claimed unused portions of the floor. Her computer was always on, and although she was extremely busy, she was never too busy to talk about her latest discoveries on the World Wide Web.

> I came across something this morning which I've never seen before where they have whole listings of people you can ask for any kind of a job you would want. So, if you're a special education teacher, I can find a resume' to show you how to write a resume' for you specifically. It's incredible!

January marked her fourth year at this university, and previously Dr. Prichard was at another university for one year. Her background as a rehabilitation counselor included experience in hospital settings, private agencies, non-profit agencies, and working with people with disabilities. In the spring semester she taught Career Counseling and supervised Master's level internships.

As a learner, Dr. Prichard described herself as needing "more than one type of modality to learn." She was diagnosed with a learning disability when she was a child and candidly stated, "You know, I've always had a very hard time learning...I'm not the kind of person who can usually listen to a lecture, take in, and do well." Working with

the computer accommodated Dr. Prichard's learning.

> Well, I think with computer that you have several modalities right in front of you, which makes it so incredibly nice. So you are finding things, and I think that has always been for me a really important part of my learning, going out and finding my own resources to supplement what I'm doing in classes or what I learned in my school classes and so forth.

A new technology requirement was added to the Career Counseling class at the suggestion of a colleague at a conference, and additional help from a department colleague who gave Dr. Prichard some Web site addresses to explore.

> And it just opened the door for me, once I got just a few. I have been able to just go so big, it's been totally amazing to me. So I have been able to expand on just general career things and get into career kinds of activities, job hunting activities for special groups like people with disabilities--there's a tremendous amount of information--and displaced homemakers, and older adults, adolescents.

Dr. Prichard spoke with animation as she described the Career Counseling assignment that had been designed with technology as a key component.

> My students in my career counseling class have a project they're doing where they are doing a..developing a one-hour career counseling module for a specialty group, ..based on information that they're getting from the net, from the World Wide Web. And what they have to do, is they have to take their one-hour presentation and they have to use it with the group of people that they developed it for. So, in other words, if they're targeting adolescents, then the four members of the group will all have developed, been participants in putting together the module. And then they will go out and actually give their presentation four different times to different adolescent groups, bring back that information, and make their presentation better, and tnen present it to our group at the end of the semester.

Using technology in the course produced both positive and negative reactions from the students. Frustrations over equipment problems surfaced in her Stages of Concern questionnaire, the semistructured interview, conversations, and the group reflective interview. She explained:

> The students are very enthused about it. But it's also very frustrating, because oftentimes, given our lab, we can't get access, and so I think that's probably the

> biggest thing that's been frustrating about it. There's so much I want to show, and oftentimes, I can't get in. And so, that's been the thing holding us back. I mean, I do have an hour every week devoted just to the computer lab, and being able, having the ability to show and do things, yet we haven't been very successful at getting all of us on. So that's been frustrating.

When asked to explain her vision of computers in education, Dr. Prichard responded in terms of counseling classes rather than in a global sense.

> I think we're just hitting the tip of the iceberg, as far as I'm concerned. I think what we're seeing, just what I'm seeing in this area, in careers, is the tip of the iceberg. And I already have..can see where it can be expanded to other classes that I'm teaching. The internship group--I think in the future I probably will try and get the computer lab for internship, at least several times during the semester, because I already did several demonstrations in my internship group this year and students are very enthusiastic about how to get on [the Web], and how to find additional information.

Dr. Sanders: Do You Know Email?

Dr. Sanders had questions ready for the regularly scheduled Monday computer sessions. The teddy bear background on the computer desktop hinted at the playful side of his personality, contrasting with the walls which held a vast array of plaques, awards, and framed covers of educational books he had authored. His university teaching career began 30 years ago, and he has been at this university for six years. During the spring semester, Dr. Sanders taught two sections of "Introduction to Elementary Education."

Reflective as he answered interview questions, Dr. Sanders often restated a question before responding. His view of himself as a lifelong learner came through in several conversations, and usually related back to how that impacted his teaching.

> How do I view myself as a learner? Well, I view myself as a learner. O.K..I see myself as that. And that if I'm going to be an effective teacher, I've got to model effective learning, so I try to picture myself always as a learner in everything I do. So I'm willing to take a risk. I'm willing to use trial and error, and trial. Uh..I'm not worried about failure anymore, although I was at one time. I'm not worried about perfection anymore. I'm more concerned about good getting better, and

> trying to reach excellence and knowing I'll never, you know, be perfect at it. So I don't worry about the ego dimensions of learning and I do this first of all for me, because it pays me off. And I don't do it for merit or recognition or anything like that. So I do it for me. I conceive of myself as a learner, and I try to make.. take advantage of all my past experience, try to be very reflective about what I do.

In learning with computers, he classified himself as "a Johnny-come-lately," but went on to explain "it's not because I've been anxious about it, it's because, you know, I've been a college administrator for the last twelve years and only been back to full-time college teaching the last two." Dr. Sanders is compiling a long list of programs to explore and things to learn on his computer, and one of his most common questions to students has become, "Do you know email?"

Dr. Sanders first added a technology component to the Children's Literature class he taught last fall. It developed as a collaboration with the Computers in Education professor who taught the students to use a database for their literature cards.

> They did it. I was so impressed by what they did, that I am going to make that a regular part of my teaching now, but I have to learn how to do it, so that I can teach them. My students were taught in the computer class, and I can't depend on that any more, that they will have had that class before they take my Children's Lit course. So I'm going to have to teach them how to do that.

In the spring semester, Dr. Sanders offered a technology component as an optional idea to be negotiated in the syllabus. Students were given the option of doing their response journals via email rather than the traditional written form. Evidence of the success of the electronic journal was provided by a student who asked if he could continue to journal with Dr. Sanders the next semester. Although he had not formally compared the quality of the traditional written journal form with the electronic form, Dr. Sanders commented on his observations.

> I would say they're just as good as the written form, and that surprises me as a teacher of writing...Some of them are better in the sense that they're fresher because they get immediate feedback from me. As soon as I read them, I

> respond to them right away. And I respond by identifying what is positive and what I want them to do next, so they get more immediate feedback.

Dr. Sander's vision of computers in teacher education extended to classroom students as well as the university program, and central to that view was the computer as a tool.

> My vision is that I would like to see computers being a tool that every student has from elementary schools on up, O.K., the poor students as well as, you know, the well-to-do students. I would like to see teachers be computer literate at all grade levels, so that the computer's a real tool for learning, and not seen as another subject area--that it's seen as integrated within, you know, the entire curriculum rather than having a computer lab with a computer expert there that we delegate, but that this becomes a tool that kids have at school and at home. And then, I, as a reading teacher and a writing teacher, am not concerned about the computer taking over, and libraries ending in reading, because I can see now that those skills I believe in, reading and writing, are really embedded, you know, within computer literacy. It's not just the technology of the computer, its the computer serving as a tool to further literacy, and further students' writing and reading.

Dr. Trebbon: Learning in Bits and Pieces

Dr. Trebbon's office was cheerful and full of light, and was carefully arranged with the desk in front of the bare window to allow for some glimpses of sky while working. Few personal touches were evident other than shelves of books which reflected a strong interest in literacy. Neat stacks of papers and files gave an impression of organization, and the computer occupied a prominent position on his desk. Dr. Trebbon used his computer at a high level for personal use, but admitted to being in new territory with the computer as a teaching tool.

Dr. Trebbon had over twenty years experience at the university level, although this was only his second semester at this university. His doctorate focused on linguistics and reading and dialect groups. Often, his interest in teacher education emerged in parallel with his interest in reading, and in his present position, Dr.

Trebbon worked with both. With teacher education he noted "the possibility of having an impact on classrooms is great."

Dr. Trebbon described himself as a slow learner, and related this to his experiences in learning new things on computer.

> I think I'm a slow learner. I plod along. I really value time for pulling back from a learning situation and reflecting...I tend to learn bits and pieces, but not as much in depth as I'd like, I guess. But that's true with not just computers, it's true in everything.

This tendency to "plod along" was evident in a workshop on using the World Wide Web. An introductory activity involved an information scavenger hunt designed to give experience with moving through Web sites. While people sitting near Dr. Trebbon were willing to show him how to get to the answers, he was determined to work through the activity on his own, at his own pace. In this case the competitive nature of the group probably served to reinforce his image of being a slow learner, but he remained good-natured about it.

Personal computer use has stayed pretty much the same over the last few months, and Dr. Trebbon tended to evaluate himself rather harshly.

> This has probably been true, as computers developed in a more and more sophisticated way, my computing has probably stayed still well behind where the machine's is, and so I still use it in a very utilitarian way to make overheads, to do my writing, to do email with colleagues, people I work with at NRC. I have not done any multimedia things, although my students are doing some of that this semester from what they tell me-- I haven't seen them yet. So I'd say I'm still plodding along, I'm not a very sophisticated user at what the machine, technology, would actually allow for.

While computer use was primarily at the personal level, Dr. Trebbon had high interest in the innovation as evidenced by attendance at faculty technology workshops and willingness to include a technology project option in the course syllabus. Reflecting on factors influencing his decision to include a technology option in his

course syllabus, Dr. Trebbon shared his reasoning.

> Partly because I think my students are already there by virtue of taking some of the classes in the ICS [Instructional and Curricular Studies] program en route to becoming teachers... But they're a much younger generation of students that are very familiar with microcomputers. They're excited about them, they pretty naturally integrate them into their work, from what I can tell. It's just an observation, but I think they're already there. I don't think I'm there, so I think in some self-serving fashion I'll learn a lot by virtue of what they produce.

The idea of "learning by virtue of what they produce" surfaced in conversation and again in the group interview. Dr. Trebbon was not intimidated by the idea of students knowing more than he did about using computers to produce multimedia projects.

> It really gives a chance to learn what they provide and to do something that may be exciting to them, a little more exciting than a typical paper task and also they may import that to a school site where they're working, which is good.

In sharing his vision of computers in teacher education, Dr. Trebbon expressed a hope that the technology could become a more transparent feature.

> I hope it becomes more fluid so that when we walk into a classroom--and I don't mean just the classrooms that are supposed to be targeted for technology--but they become a seamless part of any room you walk into. To give you a sort of counter-example, when we walk into 350A on Tuesday evenings, that sort of to me is a low technology room. There's an overhead sitting in there, there's no screen on the wall. It's not really set up very well for teaching. In fact there isn't even a chalkboard we can write on. So I would hope that we either have things on carts, which we do, or more importantly that rooms are actually set up, so that you just walk in and it's an automatic part of how you use that room for teaching.

Dr. Emher: It Makes Sense to Use Computers to Communicate

Snippets containing thoughts of the week, a poem from When I am an Old Woman I Shall Wear Purple, and assorted photocopies of cartoons adorned the outside of Dr. Emher's office door, giving an instant impression of the eclectic person within. Reading posters on the walls artistically presented commands to read books, and Dr. Emher was most often found writing at her computer. She spoke with enthusiasm about communicating by means of computers.

Dr. Emher has been at this university for eight years, and spent two years prior to that as a visiting professor at another university. She became interested in teacher education in the process of working with students in the field and teaching in the reading clinic. During the spring semester she taught the preservice teacher education cohort group in a combined reading and language arts class in the computer lab.

When asked how she viewed herself as a learner, Dr. Emher was quick to reply:

> How do I view myself as a learner? I'm a learner! I mean I'm just always feeling like I'm running off learning things and can't imagine ever living without doing it. I tend to learn about things that are of interest to me. I tend to avoid things I don't want to learn about. I tend to probably focus a lot of what I learn on teaching and ways to become a better teacher or integrate whatever I'm doing. But I love learning.

In terms of working with a computer, Dr. Emher described herself as needing hands-on opportunities. " I need as much hands-on kinds of applications or experiences and pretty much real reasons to want to learn something." Personal computer use was primarily for "word processing, stuff for class, email." Time was an issue for learning more about the World Wide Web and multimedia, although it was a goal.

Including technology in the course was an extension of Dr. Emher's belief that computers offer a wonderful means of communicating.

> Probably because it's a language arts class that I'm doing it makes sense to be doing writing and using computers to communicate, and so I thought if it was possible, I wanted to experiment and play around with doing that, with using the computer as a tool, and then also the whole notion of portfolio. It's kind of pushing the envelope for me too, a way to learn. This is like a wave of the future and I feel like I need to be aware of it so I can help my students.

Incorporating technology into the course has not been an easy task.

> Well, this semester has been very hectic. We've been out in the schools a lot and we've had a lot of trouble with just getting students on line with changes in systems. So it has almost been more of a hassle than anything else this semester so far, which wasn't exactly my vision of what I wanted to have

> happen...I'm still very optimistic about the ways that we'll be able to use the technology.

Dr. Emher's vision of technology in teacher education included ease of use and a universal acceptance of the computer as a tool.

> Part of my vision has to do with it'll just become a natural, normal thing for people to be using technology to communicate like when students are in the field to be able to write back to the supervisors or professors or whatever and just communicate that way, with each other, to work with kids in exploring the universe, you know, through the Internet. I guess I see it as a tool for many different kinds of things that will be helping our students learn so that then they can apply it in the schools...I just sort of see it mushrooming, students use of it mushrooming, our use...They're starting to see it in schools, they're starting to just feel like it's part of what people do. So I guess I see it as a communication tool as well as just a tool to get things done.

Dr. Gibson: Include Calculators in Technology

An Escher print competed with a Chinese proverb for attention on the door to Dr. Gibson's office which was hidden away within the Mathematics Clinic offices. As the semester progressed, that office became more and more cluttered with stacks of papers, folders, and notes, and Dr. Gibson became busier and busier with committees, proposals, conference presentations, manuscripts, and deadlines. Even the bulletin board showed evidence of being busy with marker-labeled file folders tacked to the cork. Dedication to mathematics education was obvious in her commitments, and she was always eager to talk about new mathematics ventures.

Dr. Gibson compieted her doctorate eleven years ago, and has been at this university for the past six years. In the spring semester she taught an undergraduate mathematics methods class and a graduate level diagnostics and treatment course.

As a learner, Dr. Gibson described herself as hands-on, and explained how that related to her learning on computer:

> I learn much more by actually doing something than reading about it or just seeing it. I think I am probably much more of that kinesthetic, haptic kind of

> learner...I learn a lot better if I'm actually doing something. If I'm trying to learn a new piece of software, oftentimes I will just sit and start playing with it, then I'll go to the book if I hit something that I can't figure out how to do it--I'll go to the manual to find out how to do it--but otherwise, I like to try and figure out how to do something myself. And there've been sometimes I've done something with a piece of software and people are saying, "You can't do that!" "Oh, you can't? Well, I'm doing it!" Because a lot of times I'll do something simply because I don't know it can't be done.

Technology was already a component of the mathematics methods class in the form of calculators, and Dr. Gibson was quick to demand that calculators be included when technology came up in faculty discussions. In the spring, an additional technology component using email was included at the suggestion of the researcher. Students were required to summarize video segments via email and to propose additional questions that were prompted by viewing the video.

> So I decided that this particular time I would try doing an assignment via the technology, so that (1) I could introduce them to some other uses of technology, and (2) it would start getting more technology into the classroom.

Introducing email requirements created frustrations on the part of some students due to university system problems with validating accounts, but the requirements also produced great enthusiasm on the part of other students.

> There has been a lot of frustration on the part of some of my students. Other students misinterpreted my instructions at the beginning of the semester to send me this one assignment by email and they've been sending me everything by email. They love it; they think it's great because they don't have to worry about passing in paper, losing that paper somewhere along the line. But during the first couple of weeks, some of their things got lost.

Dr. Gibson also mentioned that email has caused her to write more detailed responses and comments to the students than when the assignment was completed in a traditional written form.

> The computer has helped me, I think, respond to them in more, I don't want to say complete, but in a..richer response than just "Oh, yeah, you had a good thought." Because I'll say "You had a good thought here because..." and I'll

explain why I think it was a good thought rather than saying "You're on the right track."

When asked about the future of technology in teacher education, Dr. Gibson talked about the world that computers open up for students and adults.

> I don't believe that computers will take over education. When they first came out, and when we were first working with them in my doctoral program, the fear was that teachers were going to be replaced by computers and whatever. And I don't see that at all, but I do see it as the opportunity for students to see that there's a lot to learn outside the classroom as well as inside the classroom, that there's information out there that can be accessed and learned rather than that it has to be within the covers of a book or between a teacher's ears, which is unfortunately, what a lot of kids think. So I see it as opening the whole world to kids, and I also see it as a way for adults to keep learning.

Dr. Jacobs: Growing in My Teaching

Dr. Jacobs was an energetic new faculty member, and a strong advocate of technology in education. Her powerful computer, the envy of the department, was the focal point of her tidy office. Light emanated from the screen from morning until evening, and when Dr. Jacobs was in her office she was usually working at the computer exploring the World Wide Web, examining software, writing manuscripts, or communicating via email. Notes for conferences and project deadlines lined the side of the filing cabinet, and rows of bookcases were filled with books and journals related to mathematics education.

During the spring semester, Dr. Jacobs taught an undergraduate class called "Computer Uses in Education at the Secondary Level." She also taught two graduate courses titled "Applications of Technology in Secondary Mathematics" and "Instructional Methods in Middle School Mathematics."

As a learner, Dr. Jacobs classified herself as a problem-solver and stressed her need to be actively involved in order to learn.

> I'm a problem-solver, and I like to be involved. It's important for me to be able to

> think on my own. I tend to hear part of what's going on and then start thinking about it and shut off what else is going on.

Overall, Dr. Jacobs exuded confidence in her ability to teach with computers, but she always made sure she explored programs in great detail before using them in classes.

> I'm preparing for class quite a bit. I'm teaching two classes in computers and I have never taught a class in computers before. So, I'm *learning* the software that I'm teaching the students because I'm using different applications in the classroom than I use personally.

One-on-one computer sessions were scheduled periodically to expedite the learning of unfamiliar software and exploration of the World Wide Web. In those sessions, Dr. Jacobs was very protective of her control of the mouse, and was resistant to being shown something versus doing it herself. She advocated the same approach when working with her students, stressing the importance of hands-on rather than emphasis on demonstrations.

Dr. Jacobs found the use of email with her students changed her use of computers "drastically."

> And this semester, which is new..very new to me, I'm using it to communicate with my students. They are emailing me instead of journals, or maybe as journals, but not as graded journals, and I'm really communicating with my students...I'm finding that the students are opening up to me on the computer, and I'm communicating with them much more frequently and much more in depth. And really, I'm spending an awful lot of time.. talking to the students and using it to grow in my teaching.

Including an additional technology component of using the World Wide Web in the course syllabus "made sense" to Dr. Jacobs because the course was on using technology.

> I had never used the World Wide Web, really, myself, until just before this semester started, and it's so important--that just because I'm uncomfortable using it shouldn't mean that I shouldn't share it with my students. So, I guess because it's so important and such a wealth of knowledge, I've decided to use it--and because I have the support in learning how to use it.

When describing her vision of computers in teacher education, Dr. Jacobs included the element of communication and the potential of the World Wide Web as a public relations medium.

> I really, really see the computer as opening up the lines of communication, especially through the Internet--with email first of all, because as the students are leaving, they don't need to pick up the phone to call me to tell me what's going on and try to get me in the office. They can communicate and share what they're doing in their classrooms just by emailing me. And then as I become more comfortable using World Wide Web, and my students become more comfortable, I see home pages set up to sort of advertise what we're doing in teacher education, and work as P.R. and sharing of information.

Question 4. What are the concerns about integrating technology in teacher education?

Responses to the Stages of Concerns open-ended questionnaire were organized into categories using the stages developed by Hall and Hord (1987). More than half of the concerns regarding integration of technology were theoretical in nature and could best be classified at an Impact level, many dealing with Stage 4, Consequence.

> Dr. Gibson: What I need to figure out how to do is get them to see that it's not the machine that's important... it's the thinking/learning that students engage in that's important.

> Dr. Sanders: I'm concerned about an overemphasis on the technological side of teacher education which can lead to more training and less learning (a loss of the human dimension of teacher preparation).

> Dr. Trebbon: It may be that the computer makes the writing so easy that it overshadows the labor intensive, deep thinking needed to produce a superior manuscript. While the rapidity of the keyboard gets close to "shaping at the point of utterance" in writing, the mental wandering that needs to occur is still best accomplished (for me) by browsing bookstores and getting immersed in reading the work and thoughts of others.

Typical concerns when an innovation is being implemented are at Stage 2, Personal, or Stage 3, Management (Hall & Hord, 1987). Concerns at these levels were also

expressed by participants.

> Dr. Prichard: Another concern for me has to do with my ability to stay current. Technology is constantly changing and faculty must be able to keep up with the changes.
>
> Dr. Emher: Other concerns have to do with management issues such as equipment that doesn't always work, getting students "online" ...It seems that I personally don't have time to spend learning all that I need to learn, but the importance of needing to be "up" on it all because it is a priority for my classes does help to serve as a motivator.

One explanation for the high number of Impact level concerns may be that faculty at the college level are cognizant of the theoretical aspects of teaching and are focused on student outcomes. Another factor promoting concerns at the Impact level might be the support provided for technology integration, both by faculty members specializing in educational technology, and by the researcher. This support allowed the faculty greater confidence in dealing with learning new computer programs (Personal), and with overcoming equipment difficulties (Management). Ongoing support has been well-established as a key element in technology use (U.S. Congress, 1995).

Discussion

This section consists of a discussion of the findings of the study, followed by implications for teacher education programs and suggestions for further research.

Results of the present study reveal progress made in the integration of technology in teacher education courses from data gathered through questionnaires, interviews, observations, and documents. The commitment on the part of six professors to include technology and their sharing of experiences has generated increased interest among other faculty members and movement toward the critical mass needed to make change happen on a larger scale. When examining each case individually, the changes involving technology are minimal, yet when viewed across

cases, the potential impact of small changes on the overall teacher education program becomes more evident. Technology used in the six classes enabled students to expand use of email in meaningful ways, to explore World Wide Web resources relevant to topics within the classes, and to apply multimedia skills to create electronic presentations and portfolios.

While case study methodology precludes making generalizations, the participants involved in this study seemed to share some common characteristics: a confidence in themselves as educators, a strong view of personal learning as a lifelong process, and a general enthusiasm for promoting the use of technology in teacher education.

Professional confidence enabled participants to deal with the idea of students sometimes knowing more about technology than the instructor, a situation that was frequently mentioned in the semistructured interviews. Those who found themselves in this situation were not threatened by it, rather they acknowledged it. This attitude was best summed up by Dr. Sanders who stated, "... most of my students are far more computer literate than I am, and it doesn't bother me because I'm learning from them, with them, beside them." An image of the instructor as a facilitator and a learner rather than the source of knowledge is reflected in that attitude.

Whether characterizing themselves as hands-on learners or problem-solvers, each of the participants viewed their own learning as an ongoing process. Each eluded to personal goals, but time was sometimes the factor that prevented increased involvement with learning or using more technology. In terms of adult learning, each of the professors was self-directed and kept control of what they chose to attempt with technology.

Five of the six participants agreed to give up their anonymity and take part in a videotaped group interview near the end of the semester. Willingness to participate in

the interview suggested a great deal of commitment to furthering technology integration in teacher education as well as a confidence in their individual efforts. Enthusiasm on the part of the participants for integrating technology in courses had been evident throughout the semester, and that enthusiasm permeated the group interview. They described the technology components added to their courses, successes, problems, how they envisioned technology in teacher education, and other reflections concerning the integration of technology. Much of what occurred during the group interview was restatement of experiences and viewpoints previously recorded by the researcher in interviews and field notes, but reflecting in the group provided recognition and peer confirmation since the professors were not aware of what the others had done regarding use of technology. Overall, successes and excitement with respect to student outcomes outweighed problems such as equipment malfunction.

Implications for Integration of Technology in Teacher Education Programs

Implications from this case study analysis suggest that some integration of technology into courses could occur in parallel with faculty development, particularly in cases where the professor is enthused about learning and is not threatened by the possibility of students knowing more than the instructor.

Faculty support for both technical and curricular concerns surfaced as a critical element both during the study and in reflections at the end. Participants were willing to experiment with change, but only with assurance of that support.

Envisioning the integration of technology in teacher education needs further development. Some of the professors in the study considered their visions primarily in terms of the subjects they taught or education in general. Technology integration throughout a teacher education program requires a shared vision of what that technology integration entails. Innovation Configurations, the third diagnostic dimension of the Concerns-Based Adoption Model (Hall & Hord, 1987) could help

define the vision.

Recommendations for Further Study

1. The present study described efforts to integrate technology into specific courses, but the next step in the process of integrating technology into the teacher education involves development of a comprehensive plan. Students need to experience authentic applications of technology throughout the program, and this requires a systematic analysis of where the technology "fits." Future plans include use of a matrix to involve faculty in the planning of comprehensive technology integration throughout the program.

2. The present study examined technology use by six professors. A more complete picture of technology use throughout the college of education is needed to assess faculty skills and faculty development needs.

3. The present study suggested that some faculty development could occur in parallel with implementation of technology use in courses. More research needs to be done describing the effect of modeling technology use as a novice rather than as an expert.

References

Anderson, J. (1987). Choregography observed. Iowa City: University of Iowa Press.

Barron, L.C. & Goldman, E. S. (1994). Integrating technology with teacher preparation. In B. Means (Ed.), Technology and education reform (pp. 81-110). San Francisco: Jossey-Bass.

Brooks, D.M., & Kopp, T.W. (1989). Technology in teacher education. Journal of Teacher Education, 40(4), 2-7.

Colon, B., Willis, J., Willis, D., & Austin, L. (1995). Recent graduate perspectives on instructional technology: A national survey. In D. Willis, B. Robin, & J. Willis (Eds.) Technology and teacher education annual-1995 (pp. 774-777). Charlottesville, VA: Association for the Advancement of Computing in Education.

Fullan, M.G. (1991). The new meaning of educational change. New York: Teachers College Press.

Glesne, C. & Peshkin, A. (1992). Becoming qualitative researchers: An introduction. White Plains, NY: Longman.

Hall, G.E., George, A., & Rutherford, W.L. (1979). Measuring stages of concern about the innovation: A manual for use of the SoC questionnaire. (Report No. 3032). Austin: The University of Texas at Austin, Research and Development Center for Teacher Education. (ERIC Document Reproduction Service No. ED 147 342)

Hall, G.E. & Hord, S.M. (1987) Change in schools: Facilitating the process. New York: State University of New York Press.

Handler, M.G. (1993, March). Preparing new teachers to use computer technology: Perceptions and suggestions for teacher educators. Computers and Education, 20(2), 148-152.

Hord, S.M., & Hall, G.E. (1986, April). Institutionalization of innovations:

Knowing when you have it and when you don't. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Huberman, M. & Miles, M. (1984). Innovation up close. New York: Plenum.

Joyce, B. & Showers, B. (1988). Student achievement through staff development. New York: Longman.

LeCompte, M.D. & Preissle, J. (1993). Ethnography and qualitative design in educational research. New York: Academic Press, Inc.

Means, B. (1994). Introduction: Using technology to advance educational goals. In B. Means (Ed.), Technology and education reform (pp. 1-21). San Francisco: Jossey-Bass.

Mergendoller, J.R., Johnston, J., Rockman, S., & Willis, J. (1994, September). Case studies of exemplary approaches to training teachers to use technology. Office of Technology Assessment contractor report.

National Council for Accreditation of Teacher Education. (1995). Standards, procedures, and policies for the accreditation of professional education units. Washington, DC: NCATE.

Norvak, D.I. & Berger, C.F. (1991). Integrating technology into preservice education: Michigan's response. Computers in the Schools, 8(1/2/3), 89-101.

Pratt, D.D. (1993). Andragogy after twenty-five years. In S.B. Merriam (Ed.), An update on adult learning theory (pp. 15-23). San Francisco: Jossey-Bass.

Schrum, L. (1994). First steps into the information age: Technology infusion in a teacher education program. Journal of Computing in Teacher Education, 10(4), 12-14.

Stake, R. E. (1995). The art of case study research. Thousand Oaks, CA: Sage Publications, Inc.

Strudler, N.B., McKinney, M.O., & Jones, W.P. (1995). Integrating technology into teacher education courses: Longitudinal perspectives on overcoming

impediments. Journal of Computing in Teacher Education, 11(3), 15-23.

Strudler, N.B., Quinn, L.F., McKinney, M., & Jones, W.P. (1995). From coursework to the real world: First-year teachers and technology. In D. Willis, B. Robin, & J. Willis (Eds.) Technology and teacher education annual-1995 (pp. 774-777). Charlottesville, VA: Association for the Advancement of Computing in Education.

Todd, N. (1992). A model for integrating computer-based technologies in teacher education. Unpublished doctoral dissertation, University of Washington.

Todd, N. (1993). A curriculum model for integrating technology in teacher education courses. Journal of Computing in Teacher Education, 9(3), 5-9.

Topp, N., Thompson, A., & Schmidt, D. (1994). Teacher preservice experiences and classroom computer use of recent college graduates. In J. Willis, B. Robin, & D. Willis (Eds.) Technology and teacher education annual-1994 (pp. 46-51). Charlottesville, VA: Association for the Advancement of Computing in Education.

U.S. Congress, Office of Technology Assessment. (1995, April). Teachers and technology: Making the connection. OTA-EHR-616. Washington D.C.: U.S. Government Printing Office.

Wetzel, K. (1993). Teacher educators' uses of computers in teaching. Journal of Technology and Teacher Education, 4(1), 335-352.

Willis, J.W. & Mehlinger, H.D. (1996). Information technology and teacher education. In J. Sikula, T.J. Buttery, & E. Guyton (Eds.) Handbook of research on teacher education (pp. 978-1029). New York: Macmillan.

Technology Integration, Research, and Teaching: Balancing Social Contexts

Tom Bean

One of the serendipitous aspects of this project was the degree to which it made me self-conscious and reflective about my use of technology in teaching and research. In this brief presentation, I want to engage participants in a discussion of technology and its relation to social context.

E. T. Hall (1976) used the terms "high context" and "low context" cultures to differentiate communication styles across various groups of people. For example, university classes generally have a syllabus, text, and concepts introduced through lectures, reading, and discussion. The schedule of topics is formalized and shared with students. They are expected to attend classes and participate. These are low context characteristics common to much of our day-to-day life in universities and schools. In contrast, high context cultures rely on communication networks using oral language, last-minute schedule changes, and more informal styles of information exchange. High context cultures typically use and expect a more personalized form of communication. By and large, high context cultures value trust and the spoken word, low context cultures prefer the legal insurance of putting things in writing.

Some technology seems to continue the low context status quo of our typical university teaching approach. For example, presentation software, which I have used to create overheads fits a low context approach. If it is overused as a new toy, it actually has the effect of distancing the presenter from an audience. In contrast, e-mail with its eclectic blend of the formal and informal, seems to hold the potential for increasing high context communication if we can eventually see the person we are chatting with.

Videoconferencing on -line overcomes some of these problems and is increasingly available, at least in university settings (Fetterman, 1996). However, for the average user, subtle elements of body language and facial expressions remain hidden in e-mail exchanges. People "lurk" on the various internet listservs. Nevertheless, I increasingly use e-mail and voice mail to stay in touch with my students. However, for me, it remains a substitute for face-to-face communication.

The issue of social context is particularly important as our student bodies become more inclusive with an increasing number of students from underrepresented groups. Ensuring access to technology and providing experiences in its use must be balanced with an equal amount of sensitivity to the importance of culture and related communication assumptions. Otherwise, we risk creating learning environments that are not culturally conscious (Ladson-Billings, 1994).

References

Fetterman, D. M. (1996). Videoconferencing on-line: Enhancing communication over the internet. Educational Researcher, 25, 23-27.

Hall, E. T. (1976). Beyond culture. Garden City, NY: Anchor Press.

Ladson-Billings, G. (1994). The dreamkeepers: Successful teachers of African-American children. San Francisco, CA: Jossey-Bass.

Cybersurfing: A New Professor Catches the Wave

Juli K. Dixon

I have always been quite comfortable with technology. Apple IIes found their way into my life when I was in ninth grade and I took a computer programming course during lunch time. I taught my rather intimidated teachers about programming in Basic and have been teaching students and teachers ever since. Later, I became a mathematics teacher and am now an assistant professor whose responsibilities include teaching courses in mathematics education and instructional computing and technology. I received my Ph.D. in 1995. During my doctoral research phase the World Wide Web became quite popular. I was too busy to notice. The first courses I taught after graduating did not include the Internet. When I was approached to participate in this study, the Internet was the only thing that I could think of to use as a modification to my three courses, two of which were based on technology. It hit me only then that I had been neglecting that area of telecommunications and technology. I believe that I chose to exclude that topic because it was the first area that became popular without me. I was not ahead of the wave. My students would likely have more experience than I. Is this what my teachers felt like when I was in ninth grade? Incorporating an area of technology with which I was less proficient than many of my students was a valuable growth experience for me as a teacher educator.

I was teaching an introductory survey of computers in education course, confidently telling my students that they needed to become comfortable with technology and use it in their teaching. I told them that I understood that computers were new to them and teaching was also new but the appropriate use of technology was important and could not be neglected in their instruction. I explained that they did not have to be experts they only needed to know how to use technology well enough to share it with their students. Their students would be able to help them if they needed assistance. Had not I helped my teachers in ninth grade? What was the problem?

In reflecting on the experiences gained through involvement in this study, I finally understand "the problem." Using new technology in instructional settings can be intimidating if you do not feel as though you are the expert and I had not placed myself in that situation until this past year.

I had been in front of the wave. Programming in Basic and Pascal became second nature during high school. My teachers were struggling to keep up. I always got a kick out of teaching my teachers new commands, they never seemed as happy with the situation. Actually, come to think of it, they seemed to be pretty stressed out.

My college papers were written on word processors. I helped out in the computer laboratory while student teaching. My first teaching position associated me with a grant to incorporate technology into mathematics instruction. My Macintosh helped me through graduate school and my dissertation focused on using technology in mathematics instruction. I was quite computer literate and could not understand why it was so difficult to convince other teachers to use computers in their instruction. The teachers were impressed with the computer's capabilities and convinced of their value in instruction but never seemed to catch the wave. It was difficult to understand their procrastination.

I now understand. Until I became involved in this study and Christy Falba suggested incorporating telecommunications in my courses, I had not realized that I was procrastinating as well. I new that the World Wide Web (WWW) was an important instructional tool yet I did not use it during my first semester as an assistant professor. I had taught classes that would have certainly benefited from the WWW. What was my problem? My problem was the same problem that I saw in my preservice and inservice teachers and, come to think of it, even in my ninth grade teacher. I was intimidated. This was one wave on which I had not yet ridden, I had missed it all together. I had been so busy writing my dissertation when the WWW became popular that I had not even noticed. Now it was an accepted source of a vast amount of information and I had no access. What if I got confused while demonstrating its use to my students and could not find what I

needed? What if my students asked the meaning of http or html and I could not tell them? What if my students wanted to make a Web page? What if my students knew more than me? I might look ignorant in front of my entire class!

Christy told me what I had been telling my students. It's OK if you do not know everything. Just be honest, prepare as best as you can, and if you get stuck and a students can help, let them. I was terrified. I did get stuck and a student was able to help. Everything was OK. I had learned the very hard lesson I was trying to teach my students. It's OK if my students know more than me on occasion, they are resources too. Step aside and let them shine.

My ninth grade teachers certainly let me shine on the computer and look where I am. It took me a long time to experience what they must have been feeling the first time they had to ask me to fix an error in their program or to write a command to make the computer add two fractions. I now have a better understanding of how my preservice and inservice teachers feel as they consider technology integration and I believe that I am a much more effective teacher educator for the experience.

JUST THE TIP OF THE ICEBERG

A Paper Presented at the Annual meeting of the American Educational Research Association

by

Patricia A. Markos, Ph.D., CRC

Chicago, IL
March 25, 1997

Just the Tip of the Iceberg

The purpose of this paper is to describe a career counseling curriculum which utilizes the Internet. The Career Theory and Practice graduate course has traditionally been designed to help students develop an understanding of career development across the lifespan. The intent is for students to develop a knowledge base concerning career theories and techniques for exploring the interests, aptitudes, and values of clients in order to assist them in making reasoned career decisions. Specifically, this paper will describe how technology was incorporated into a graduate level Career Theory and Practice course, the response of students to using the Internet, and my own personal reactions to using technology in a course.

TECHNOLOGY IN A CAREER COUNSELING COURSE

My first exposure to the Internet and all of its possibilities occurred when the counseling department obtained Netscape, a program which accesses the World Wide Web. I started my cyberspace journey by experimenting with different search engines found in Netscape. I soon discovered that I could find any topic I was interested in under Netsearch. As I continued experimenting, I found that much of the information was incredibly useful, relevant, current, and professional. The most difficult aspect of using the Internet was sifting through the information, because on any given topic there could be hundreds of entries to review, some of which was in no way relevant to my topic of interest. I found that

depending on the particular words I used to search out a specific topic, I came up with a number of different entries. As I became more proficient, I was able to narrow my topic significantly.

In preparation for teaching the class, I began an extensive search of the World Wide Web for sites related to specific topics outlined in the text, *Career Counseling Applied Concepts of Life Planning* by Vernon G. Zunker (1994). I believed at the time that information gathered from the Internet would be useful supplemental material for teaching the class. What I found was a abundance of information in the areas of career theories, career life planning, computer technology in career counseling, standardized assessments in career counseling, career guidance in schools, career counseling for adults in transition, career counseling for various ethnic groups, career counseling for people with disabilities, career counseling interview formats, and even direct access to the Dictionary of Occupational Titles (DOT) and the Occupational Outlook Handbook (OOH).

Because there was so much career educational materials available on the World Wide Web, I decided to incorporate a major technology component into the Career Theory and Practice course. The weekly technology segment of the course took place in a computer lab where students were required to learn how to search for career information on the Internet. The major project for the course involved students developing a career counseling workshop for a particular group of people

(I.e., adolescents, children at risk, displaced homemakers, older adults, people with disabilities) based on information gathered from the Internet. After developing the workshop each student was required to present their specific career counseling program to their identified target group and write a summary including strengths and weaknesses of the presentation and feedback received from the audience. The feedback, strengths and weaknesses were then taken back to the group and incorporated into a final presentation and paper.

Student presentations and papers surpassed my expectations for the project in every way. Project topics were diverse and included 1) a career presentation for adolescents who were socioeconomically at risk (i.e., http://www.wm.edu/catapult/resmdir/contents.html; http://rescomp.stanford.edu/jobs/#servicesrrassocresumes); 2) career counseling for people with disabilities in terms of the American With Disabilities Act (i.e., Alexander,1996); 3) career counseling for women in transition (i.e., Ford, 1995; Noring, 1993); 4) job interviewing skills for individuals in substance abuse treatment programs (i.e., Zeitech Corporation, 1996); and 5) a career interests small group structured workshop for high-risk youth (i.e., CareerNet Project Home Page [on-line]).

STUDENT REACTIONS

Student reactions to the technology component of the Career Theory and Practice course were generally positive. There was consensus among students regarding the value of incorporating technology into the career

curriculum. Those students with the most computer literacy seemed to adapt well to the assignment and were also the ones who put forth the most effort. The biggest frustration for students was in getting access to the Internet. There were many times during the semester when it was impossible to get onto the World Wide Web during scheduled class time. This presented a hardship for some students who did not have access to a computer and the World Wide Web at home. Several computer labs were available for student use, which solved part of the accessibility problem.

MY PERSONAL REACTIONS

The results of incorporating technology into the Career Theory and Practice course had negative and positive consequences for me. Some problems existed in actually implementing the technology part of the curriculum. Space was limited in the computer lab so sometimes students had to double up on computers. This was especially problematic when computers in the lab were down for one reason or another. Additionally, there were times when the computer lab was not available for use because of scheduling conflicts. Last, student proficiency with computers varied greatly so there were instances when I had to spend a lot of time explaining the basic functions of the computer. On the positive side, the future of career counseling is in using technology and in the next few years this area will continue to grow. I enjoyed searching out different sites to share with students and felt the positive experience for students and also for myself far outweighed the negatives. As we discovered

information in the career area is vast and obviously only the tip of the iceberg.

REFERENCES

Alexander, R. (1996). Understanding the Americans With Disabilities Act. [On-line]. http://seamless.com/talf/txt/disact.html

CareerNet Project Home Page. (1996). [on-line]. http://www.lib.occ.cccd.edu/occ/cnp/CareerNet.html

Ford, A. (1995). The Keirsey Temperament Sorter. [on-line]. Http://www.gse.rmit.edu.au/~rsedc/keirsey.html

http://rescomp.stanford.edu/jobs/#servicesrrassocresumes

http://www.wm.edu/catapult/resmdir/contents.html

Noring, J. (1993). A summary of personality typing. [on-line]. http://sunsite.unc.edu/personality/faq-mbti.html

Zeitech Corporation. (1996). Effective interviews. [on-line]. Http://www.zeitech.com/intervi.html

Zunker, V. G. (1994). Career counseling applied concepts of life planning. Brooks/Cole Publishing Co., Pacific Grove, CA.

Learning to deal with ambiguities of electronic portfolios: Reassessing visions of technology to deal with reality

by Marilyn McKinney

Choreographing. I like that way of thinking about my teaching. Although I'm not a dancer or a choreographer, I have some ideas about what each does. As a child I took ballet lessons, and over the years I have attended performances (ballet as well as many Las Vegas productions); I've found myself engrossed in movies and books about dancers and choreographers; and for several years now, I have listened to colleagues on the University Academic Freedom, Tenure and Promotion Committee discuss what it means to be engaged in this creative pursuit. Although I am an outsider, I stand in awe of what it must take to orchestrate all the movements and dancers that come together to develop a show.

Similarly, as a teacher educator in the field of literacy, I find that while I embrace a vision of how technology might enhance the learning in my classes, as a tech person I am an outsider. I have read at least some of the research literature, attended workshops, and learned about what my cyber-ready colleagues are doing with technology via the various listservs I've joined or through surfing the web. Actually, I've done more than that over the years because I've chosen to teach both my graduate writing class and several sections of a literacy methods block in the computer lab. In doing so, I always find it difficult to balance my attempts to encourage and support the use of technology in authentic ways and still "cover the content" that needs to be part of my classes.

Why do I choose to incorporate technology? Clearly, there are authentic uses -- to facilitate composing, to communicate, and to search for information via the web. A few years ago, on the first day of my writing class, I would document the number of people who chose to use a computer to compose. Usually, there were just a few brave souls, but gradually the supportive community took over and it became a natural part of the class to help each other with technology in ways that were similar to how we helped each other with our writing. More recently, nearly everyone enters the class "computer-ready"; in fact, they are often thrilled to discover the class is meeting in the lab. However, as students enter my classes with knowledge about technology, I find myself falling further and further behind. Once I viewed myself as a pioneer; now I find myself engaged in the battle of time -- there is so little time for learning all of the new applications

of technology, my own and my students'.

I've also chosen to use technology because of the tremendous support system that has evolved within our college. As faculty we know that we will be supported whenever possible with workshops, upgrades on equipment and knowledgeable coordinators who take time to show us how to use new programs, or to problem solve when we've dug ourselves into what seems like an unsolvable problem. There is a clear culture of support which fosters the integration of technology at whatever level is comfortable.

Perhaps this culture of support helps to explain why in the Spring of 1996 I managed to gather up my courage, and venture into technological realms that were beyond my comfort level. I decided it was time to bring technology to my use of portfolios with undergraduates in my reading/language arts methods block. These students were part of CLIMB (Collaborative Learning Instructional Methods Block), an experimental cohort program in which undergraduate elementary education majors attend their classes together and work cooperatively with instructors, field supervisors, and teachers at two school sites in an attempt to integrate methods coursework with field experiences. Technology was a strand that was woven throughout the three semesters of methods coursework and whenever possible integrated with other courses and within assignments. In addition, at least some members of this group had developed a portfolio in an earlier Introduction to Education course. Thus, asking my students to develop electronic portfolios that would show growth and learning and integrate the content from their methods coursework with their experiences in school sites seemed to be an appropriate move for that point in time.

The time was right according to my research agenda as well. I had focused on portfolio self-assessment in literacy education classes for the past six years; with the advent of easy to use multimedia programs such as HyperStudio which could take advantage of the nonlinear connections, it made sense to extend my knowledge of portfolio development in this way. And so, I scheduled class in the computer lab and began the process, cognizant of the need to build in, a little at a time, the necessary support structures. Christy demonstrated ideas for getting started and provided tips and templates; I provided time in class and opportunities to share ideas.

Constructing portfolios without the added constraint of technology is difficult enough. In spite of our efforts to build on what students knew and to provide time to work in class, the dance we performed seemed more like a battle scene than the finely choreographed classroom of engaged

portfolio constructors I had envisioned. Time in class wasn't enough time. HyperStudio, itself was fraught with inexplicable bugs that sent even the most dedicated and confident student into tears -- Jolene, for example, started over 9 times because the program froze on her and wouldn't let her add or change what she had started with. There was also not enough room on individual disks to allow students to include all of the things they wanted to include and that I had envisioned -- video clips of their teaching, classroom photos, examples of their students' growth and learning, and links to other classes and experiences. In spite of my efforts to convince these emerging teachers that they were on the cutting edge, that principals interviewing them for jobs in the future would be awed by their portfolios, the reality that few principals would have the technological knowledge or capability to view them, began to hit home.

I continue to grapple with these factors. At the time, and even now, I have questioned my motives and my decision to assign this project. In the end, many of the final portfolios represented examples of highly imaginative, reflective, integrated learning. In reality, the constraints of the HyperStudio program forced my students to face the realities of how to show their growth and learning in limited space; they were forced to be selective. In the process of being selective they were able to use the reflective process to step back and ultimately present the big picture. They had grown.

I continue to wonder about other realities. The issue of time-investment remains problematic -- is it worth it, at the expense of the literacy content that might have occurred? Would constructing paper portfolios have shown the same thing and taken less time? If I had been more knowledgeable about how to get around the problems inherent in HyperStudio, would time have been less an issue? Would other technologies have been better -- using web pages, for example, to accomplish my purposes? What about access to technology? Those students who had access to computers at home seemed more able to think about the natural integration of technology into their teaching; I know this is true for my own use.

As I try to balance the ambiguities, the reality of keeping in mind my obligation to the future remains. I realize that as technology becomes more widespread and easier to use, some of the ambiguities I dealt with will dissipate. The reality of the situation is, as Patty, one of the CLIMB students, explained last fall during a focus group interview related to electronic portfolios, "They are vital for Teacher Ed programs -- we all need to use and experience them!" At this point I

remain the outsider, in search of different ways of choreographing this electronic dance of self-assessment, balancing the need to envision the future while dealing with the realities of the present.

E-MAIL DIALOGUE:
SUPPORTING THE PRESERVICE TEACHER'S PERSONAL-PROFESSIONAL VOICE

A Paper Presented at the Annual Meeting of
The American Educational Research Association

by

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E-Mail Dialogue: Supporting the Preservice Teacher's Personal-Professional Voice

Introduction

This paper aims at describing how a teacher educator is using technology to assist preservice teachers to become more reflective practitioners. More specifically, this paper will describe how one instructor uses e-mail to dialogue with his students who are completing a 32 hour observation in an elementary school. The focus of this initial field experience aims at assisting the preservice teacher to collect information about the personal and professional demands of being a teacher, information he or she will use in giving voice to his or her reflections and to the ultimate decision, "Do I really want to become a teacher."

The primary aim of this paper, however, is not to describe the effectiveness of the application of technology to the improvement of instruction for future teachers. The primary purpose is to describe the steps this teacher educator took to technologically "trip the light fantastic", that is to integrate technology into the improvement of his instruction.

My Story

I entered the teaching profession in 1963 as a secondary English teacher. After a decade of teaching English literature and composition at both the elementary and secondary levels, I began my career as a teacher educator. Perhaps my "veteran" status, (a euphemism for an over-the-hill professor), will explain why I am one of the last of my colleagues to join the technology dance. There are, however, three other

reasons that explain my initial resistance to integrating technology into my instructional repertoire.

First of all, English literature majors have a conservative streak that comes from the reverence they maintain for literary tradition, for the transmission of the wisdom of the ages, and for printed books. They heed the warning of the neoclassical poet, Alexander Pope, to be skeptical of innovation, but to be open to progressive change:

Be not the first by whom the new are tried,

Nor yet the last to lay the old aside (Pope, 1711).

A second reason for my resistance to the integration of technology into my instruction can be found in my considered belief that the qualities of a gifted teacher will not be found in her mediated methods or her technological tricks, but in the human dimensions of integrity, compassion, humor, cultural sensitivity, and egalitarianism with which she weaves a web crafted to catch even the most reluctant of learners. When these and other human dimensions are cultivated, a teacher can genuinely act, as Carl Rogers put it so succinctly almost thirty years ago, "as a person, not a faceless embodiment of a curricular requirement or a pipe through which knowledge is passed from generation to generation (Rogers, 1969).

The third reason that explains my past reluctance to become more involved with using technology to support my efforts in assisting my students to become more reflective thinkers resides in the nature of reflection. The the kind of professional reflection I find described most often in the literature of teacher education has been identified as reflection (Sparks-Langer & Colton, 1991). Technical reflection involves the ways teachers think about effective instructional methodologies, developmentally appropriate learning sequences, supportive learning environments, and the utilization of effective instructional resources.

While these technical dimensions of instruction are supported by teacher

reflection, I have been concerned that teacher educators have so over-emphasized technical reflection that another needed kind of reflection has been neglected. If teachers are going to be more than technologists, they must also cultivate the practice of *critical* reflection (Zehm & Kottler, 1993). By being critically reflective, teachers consciously consider the moral and ethical implications and consequences of their professional practices. In our postmodern world that is skeptical of the past promises of science and technology, I believe it is imperative for teachers to maintain a conscious balance between technical and critical reflection. My uses of the e-mail journaling have begun to quell my initial concerns about my students' possible over-emphasis on technical reflection. For the most part, their e-mail entries revealed a genuine balance between technical and critical reflection.

So, now that I have described the reasons for my reluctance to join the technological chorus line, how did I ever get choreographed into this coterie of excited, young professors at UNLV who are working to integrate technology into teacher education? Initially, two related influences persuaded this battled-scarred professor to get involved. The first influence was a warm, caring invitation from Christy Falba, a doctoral student who was choreographing this effort supported by the College of Education to assist faculty to develop the knowledge, skills, and attitudes needed to integrate technology into their instructional repertoires. Let me repeat this, it was a simple, human invitation, the power of which began to open the doors to the dance for me.

The second related influence was the fact that I was not only invited to the technology dance, I was provided with the equipment, the software, the ethernet connections, and the e-mail accounts for my office and home with which I could begin to learn the dance. This substantial investment of my College began to convince me of my need to make an investment in my professional growth. But the major influence in

my learning all the right moves was not the hardware or the software, but in the step-by-step, one-on-one support that I received week after week, semester after semester from the choreographer of our movement to integrate technology. With her good-humored, patient assistance, I have learned to use technology in several ways that have significantly improved my teaching. Let me share one of the ways I have been enabled to integrate technology, with the help of the support system, (Joyce, Showers, & Bennett, 1987), provided by Neal Strudler and Christy Falba.

My Students' Story

During one of my weekly training sessions, conducted in my office and with my Power PC, Christy gave me another invitation. "Have you ever thought of journaling with your students via E-mail." I had not. I was one of the last professors to be wired for e-mail service and Christy was teaching me how to use it. That invitation was given to me two years ago and since then I have invited my students to use e-mail as an alternative to writing their journal reflections of their classroom observations in a spiral notebook. In each of the three subsequent semesters, over half of the thirty students in the three sections have selected the e-mail option for recording their journal reflections. Christy provided those students who wanted to participate but lacked the necessary skills with the needed training and personal e-mail accounts to get started.

After slow, cautious starts, the participants began to send me their carefully measured reflections. Their voices were hesitant . . . they appeared to be looking for the right words . . . the words they think I wanted to hear. Because I am now able to read and respond to their e-mail journal entries on the very same day they send their reflections, I am able to provide the encouragement, the gentle assistance they need to direct their questions, concerns, and emotions, their doubts and fears, joys and delights, not to me, but to their own continuing self-reflection. I cannot give the same

immediate feedback to students who turn in their written journals on a weekly basis.After using the e-mail journals for three semesters with approximately forty students, I can tell a difference. The e-mailed voices appear less anxious about being corrected, the informal nature of e-mail messages have liberated their expression of the fear of the conventions of spelling, grammar and usage. The written journal messages are measured by the page and rarely do I find a student writing more that one page per entry. The e-mail entries of almost all of my students are lengthy, with more and more profound personal and professional reflections.

The surveys I have conducted reveal a high degree of student satisfaction with the e-mail journal alternative. Students have identified many positive elements that they like about the e-mail journaling process. "I find it easier to express myself in the e-mail journals," one student maintains. "I prefer e-mail over written journals," another student affirms, "I don't have to pack around an extra notebook." The most common element of satisfaction with the e-mail journaling process, however, is the feedback they receive from their instructor: "I love the immediate feedback I get from my e-mail journals," one student gushed. Another recalled, "Its biggest benefit is the feedback. From past teachers, I've been lucky to get over one written sentence of feedback on my written journal."

Although their evaluative comments about the efficacy of this technological integration are reassuring, I am more convinced by the enthusiasm and passion I hear in the voices of my student whose e-mail messages I look forward to reading each day. Listen to the proud, passionate, personal-professional voice of Jamie, the student author of the last e-mail journal entry I read today, March 4, 1997:

> In this journal I am supposed to evaluate myself. I suppose my demeanor in the classroom is stable, my appearance is excellent, and my willingness to participate in any and all activities is exceptionally high. My attitude toward this profession seems to have bloomed. I once thought that

teachers were just that, teachers, but as my school work and class work continue, I prove myself wrong. Teachers are professionals . . . we teach, learn, judge, accept, help, hinder, you name it, we do it. It is fascinating to me that one person, a teacher, can help or hinder a child so drastically. Because of this I am proud to state that I want to be one of those teachers who helps a child grow, thrive, and achieve all that is possible. I am proud of myself for putting in my observation hours with effort and passion.

For the first time in my life, I truly think I know what I want to become -a teacher! I think I can handle the pressures of staff, parents, children, and myself, but I cannot write the word on the board until I am standing in "MY" room. The only thing I have to carry me is my faith and will, I think it is enough.

References

Joyce, B., Showers, B., & Bennet, B., (1987). Synthesis of research on staff development: A framework for future study and a state-of-the-art analysis. Educational Leadership. 45-3, 77-87.

Pope, A. (1711). Essay on criticism (335-336). In M.H. Abrams et al. (Eds.). (1962). The Norton Anthology of English Literature, Vol 1. New York: W. W. Norton, 1440.

Rogers, C. (1969). What it means to become a person. In F. Natalicio & C. Hereford (Eds.), The teacher as a person. Dubuque, IA: William C. Brown.

Sparks-Langer, G. & Colton, A. (1991). Synthesis of research on teacher's reflective thinking. Educational Leadership, 48-6, 37-44.

Zehm, S. & Kottler, J. (1993). On being a teacher: The human dimension. Newbury park, CA: Corwin Press.